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Impact of Ambient Hydrogen Sulfide and Total Reduced Sulfur Levels on Hospital Visits for Respiratory Disease in Dakota City and South Sioux City, Nebraska, during 1998 and 1999

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Impact of Ambient Hydrogen Sulfide and Total Reduced Sulfur Levels on Hospital Visits for Respiratory Disease in Dakota City and Southin Sioux City, Nebraska, during 1998 and 1999 DAVE CAMPAGNA, LEWIN MICHAEL D, INSERRA STEVEN G, PHIFER BETTY L, WHITE MARY C. Division of Health Studies, Agency for Toxic. EMail: DTC2@CDC.GOV

Methods. Information on outpatient and inpatient visits for respiratory diseases (ICD-9 codes 460.0 through 519.9) during 1998 and 1999 was obtained from two local hospitals. During the same period, 16 H2S and 3 TRS monitors placed in selected locations recorded ambient and indoor concentrations on a continuous basis. The relationship between H2S and TRS measurements and the daily number of hospital visits will be assessed using Poisson regression models, which will control for climatic variables. To assess potential short- and long-term effects, air pollution levels will be analyzed in relation to hospital visits for respiratory diseases during the same exposure day, and the 2 following days. As a comparison, we will also examined hospital visits for digestive diseases (ICD-9 codes 520.0 through 579.0), which have no plausible relationship with exposure to H2S and TRS.

Background. In response to public concern about respiratory diseases in Dakota City and South Sioux City, Nebraska, the Agency for Toxic Substances and Disease Registry (ATSDR), conducted a study using hospital records to examine the relationship between respiratory diseases and ambient measures of hydrogen sulfide (H2S) and total reduced sulfur (TRS) (a combined concentration of sulfur in air from H2S, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide).

Results. Contaminant levels measured in Dakota City and South Sioux City varied with the seasons, with the highest values measured during the summer months. Four monitoring locations recorded peak concentrations of H2S greater than 90 parts per billion (ppb), the ceiling limit of detection. Other residential monitoring locations recorded multiple peak levels of H2S between 30 and 50 ppb. Compared to indoor concentrations, ambient levels of H2S were higher in concentration but shorter in duration. During the first 22 months of the study period, there were 2,573 visits for respiratory disease and 1,516 visits for digestive disease.

Conclusions. The health effects of ambient low exposure to H2S among the general population, and in particular among children and elderly, are still unknown. The existence of multiple ambient air measurements of contaminants on a daily basis in these communities offer a unique opportunity to examine the relationship between H2S or TRS and hospital visits for respiratory illnesses using time-series methods. The results will be presented.